

Abstract:

Source: EP0344399A [EN] The rotors (2) serving as rotating tools and the stators (3) serving as stationary tools of a dispersing machine (1) are formed as flat discs arranged axially side by side and having perforations (4 and 5), so that radially overlapping toothed or slotted tool rings in each case and the involved and expensive manufacture thereof are no longer necessary.

[DE] Die als rotierende Werkzeuge dienenden Rotoren (2) und die als stehenden Werkzeuge dienenden Statoren (3) einer Dispergiermaschine (1) sind als axial nebeneinander angeordnete flache Scheiben mit Durchbruechen (4 und 5) ausgebildet, so dass sich jeweils radial uebergreifende gezahnte oder geschlitzte Werkzeugkraenze und deren aufwendige und teure Herstellung eruebrigen.

Machine translation EP0344399A

Dispergiermaschine

The invention concerns a Dispergiermaschine with at least one rotor as rotary tools and at least this neighbouring and with it cooperating stator as standing tools, whereby rotor and stator have break-throughs, which agree alternating with one another during the turn of the rotor and is against each other transferred and which by them through promoted medium and its components disperse.

Such Dispergiermaschinen are well-known. The rotors and the stators are about topffoermig trained, whereby the wall of a such kopffoermigen tool as toothed or slit wreath/ring, which spreads the other tool over a certain axial length radially. In these tool tools or walls axialoriented, radially going through slots are intended as break-throughs, at whose edges the Dispergierwirkung arises.

Such Dispergiermaschinen worked satisfactorily, however the usually several times axially one behind the other arranged rotary and standing tools and also the tools interlinking in many cases with several concentric wreaths/rings or walls are very expensive in their production. In addition the danger exists with these tools that when dispersing with fibers or such solids enriched mixtures or mixtures the slots of the rotors and/or the stators are clogged and thus the Dispergierwirkung are totally or partly prevented.

There is therefore the task to create a Dispergiermaschine of the initially mentioned kind with which the tools are more inexpensive producible and nevertheless the Dispergierwirkung is at least decreased about directly or even better and the danger by blockages of the passages by the tools.

Those surprisingly simple solution of this task however substantially deviating from the past tools consists of the fact that the rotor and the stator are a flat disk with break-throughs in each case. Thus axially extending tool tools with Druchbruechen avoid themselves. The substantial advantage results the fact that only disk-shaped tools are planned, which are substantially more simply producible and also substantially more simply with the break-throughs will provide can, than with toothed or slit tool tools or - struggle provided Werkzeuge. Auch blockages of the break-throughs can break-throughs which can be crossed fast and less easily to arise, since the ways of the property are through shorter by the respective disk and the entire disk surface is available, in order accordingly many, large and elongated and thus also from fibers well less to accommodate be able. Many for a good or even better edges important nevertheless result Dispergierwirkung in each case at the in or withdrawal of such a break-through or slot at the respective disk. It participates particularly appropriate, if the break-throughs are in the disks over their surface and/or extent distributed slots. These slots can be preferentially radially and/or diagonally to the disk diameter arranged. Thus the material seized in the rotors of these slots can be outward exposed also to a centrifugal energy and a hydroextracting.

The Dispergierwirkung knows further increased and a cooperating of the rotors except with the stators also with the housing wall can be achieved, if at least particular of the break-throughs or slots of the rotor and/or the rotors is or all break-throughs or slots at the disk extent edge open. About axially material the occurring these slots or break-throughs then hurled due to the rotation of the rotors with its depresses also radially outward and can partly at the extent of the disk withdraw, so that according to different flow components and turbulences develop.

For the production for example with the help of a drill or a if possible simple punching tool the slots can continuous width preferably to have and it be able at a tool disk next to each other to be alternating longer and shorter slots distributed at the extent. Above all the longer, from the inside outward oriented slots increase with continuous width their distance to each other, so that in this angle angle between two from the inside outward prominent slots at least a shorter slot can place-find.

For the production and the Dispergierwirkung it is favourable, if the stators and the rotors have agreeing break-throughs, which are arranged preferably in over one of timmenden distances to the axle center of the tools, so that during rotating all break-throughs of the rotors with all break-throughs of the stators arrive again and again in agreement and are again against it transferred. Intermittently a part of a mixture or a mixture let through by the break-throughs of a tool can be taken up thus in each case and resumed by the next tool and its break-throughs. Again and again the taking place interruption by rotating of the rotors causes thereby at the slot edges the desired Dispergierwirkung.

An intensified Dispergierwirkung results, if several are arranged from rotor disk and stator disk existing tool kits axially next to each other in each case. Accordingly often the property the change suspended between depresses through a standing and through a rotary tool. Thereby it is appropriate if the distance between rotor and stator is smaller than the distance to the next tool kit. Thus to a certain extent chambers between the individual tool kits are formed, in which the kinetic energy in the mixture some more, produced by the rotors, can have a lasting effect.

An arrangement of the invention of own importance worthy of protection, which is made possible particularly by the training of the tools as disks, can consist of the fact that the distances between rotor and stator are adjustable. Thus the Dispergierwirkung lets itself adjust depending upon characteristics, for example depending upon viscosity of the property which can be worked on in the best possible way.

This can be in particularly simple way thereby carried out that at least one is intended that or the stators at the outer edge interspersing adjusting spindle od. such in particular, with which the stators relative to the rotors axially adjustable and definable is. Perhaps form closure between this adjusting spindle and a stator can be sufficient or for it belonging to spacer, if the stators and their spacers all among themselves firmly - although are if necessary cash.

The above-mentioned adjustableness of the distances permits a fast adjustment to most different goods, so that Flüssigkeitsgemische, which can be worked on, mixtures from liquids and solids and/or liquids and gases can be this-jetty-craved. A very small distance in each case between a rotor and a stator has with the fact the additional advantage that between these two disks a meal effect can be obtained, so that fixed components of the mixture in run the promotion by the machine ever more be made smaller can. The dispersion result is accordingly good.

The rotors and/or the stators can be individually in each case solvable on the driveshaft and/or lined up on retaining elements or - staffs, if necessary by spacers held distance. This has the advantage that they can be replaced depending upon wear also individually.

Since the goods which can be dispersed and the dispersion tools of a far promotion usually oppose a certain resistance, it is actually well-known to connect to the Dispergiermaschine a pump. The disk-shaped training of the tools permits it now that on the drive shaft/the rotors in promotion direction of the property before the first tool kit a pump impeller is located preferably. Thus a complex and expensive, separately upstream pump can be saved. This arrangement is above all appropriate if the driveshaft is horizontal arranged, is not thus supported the reforwarding of the property by the force of gravity or a promotion directed upward is wished.

The disk-shaped training of the standing and rotary tools permits also a constructionally simple structure to the entire machine, whereby into their housing the stators with their spacers recapitulatory can be planned, in particular oh savings alleles attaching pins od. such. Furthermore the adjusting spindle can be arranged for adjusting the distances of the relocatable stators opposite the rotors between housing wall and outside extent of the rotors, firm on their wave. The housing coat can be strutted with a cover containing a supply opening on the one hand and an outlet casing on the other hand connecting bolts interspersing by it. All these screws, attaching pin and spindles can be accommodated thereby parallel to each other transferred at the extent against each other comfortably.

It is still mentioned that with a modified execution form the stators fixed and the rotors with their wave could be axially adjustable, in order to change the distances between stators and rotors. This will make however necessary that also that makes possible frequently submitted transmissions an appropriate adjustment of this wave for the wave.

Altogether particularly everything of the before-described characteristics and measure a Dispergiemaschine, with which the dispersion tools are substantially more simply producible, both the rotary and the standing tools, results nevertheless however additional possibilities opens, like for example changeable distances and meal effects in the case of application individually or. The advantage remains simultaneous that the rotor-basic wave can be stored flying, so that good admission of the property on that remains turned away side to the storage. It is also favourable that this flying stored wave is not exposed to or hardly radial moving forces due to only axially each other the neighbouring tools and break-throughs, so that perhaps the assigned camps can be smaller dimensioned and thus more inexpensive. Remain nevertheless at the tools the Scherwirkungen, turbulences and changes of speed or accelerations, which affect dispersing the property received.

Below the invention with their is still more near described it as substantially belonging to details on the basis the design in a remark example.

It shows in schematized representation: Figure 1 a partial profile by a Dispergiemaschine with disk-shaped tools, whereby the drive of the driveshaft is omitted, and figure 2 a cross section of the Dispergiemaschine in accordance with the line of A-B in figure 1.

One generally speaking with 1 designated Dispergiemaschine has neighbouring in each case stators as rotary tools rotors 2 and these 3 as standing tools. Both rotor 2 and stator 3 have thereby break-throughs 4 and 5, which agree alternating during the turn of the rotors 2 with those of the stators in situation and form and against it are transferred. Thus at the entrance 6 in accordance with the arrow Pfl supplied and 3 media with its components, through-promoted by the tools 2 and, one disperses. During common view of the figures one recognizes 1 and 2 that the rotor 2 and the stator 3 are in each case a flat disk with the break-throughs 4 and 5. In addition this results in very inexpensive production of these tools and permits an influence of the characteristics and possibilities of the machine 1 for example by differently thick disks, because then the axial ways of the property can be different by the break-throughs through 4 and 5.

In figure 2 it is recognizable that the break-throughs are 4 and 5 slots distributed in the disks over their surfaces, which are radially arranged in this case. They could run however all or partially diagonally to the disk diameter or have in their process bends or breaks. The radial arrangement is not however particularly simply producible and effectuation within the rotors due to their turn and the centrifugal energy a partial hydroextracting of the property produced by it outward against the housing wall 7, since these schlitzförmigen break-throughs are 4 and 5 in accordance with figure 2 edge open, thus at the extent of the rotor disks limited is.

The slots have continuous width in the remark example, so that during the selected radial arrangement their distance grows from the inside outward. One recognizes now in figure 2 that at such a tool disk alternating longer slots of 4 and shorter slots 5 are distributed at the extent next to each other.

The stators 3 and the rotors have 2 agreeing break-throughs 4 and 5, which are arranged in agreeing distances to the axle center A of the tools, so that during dispersing all break-throughs of the turning rotors 2 with those of the stators 3 arrive again and again in agreement and are again against it transferred. Since the tools are disk-shaped 2 and 3, a large number of such tools fits axially next to each other with continuous machine size. One

recognizes 1 in figure that several from rotor disk 2 is arranged and stator disk of 3 existing tool kits axially next to each other in each case. According to strong turbulences and Scherwirkungen can be produced over the length of the machine 1. One recognizes 1 in figure that the distance S between a rotor 2 and a stator 3 is smaller than the distance to next from rotor 2 in each case and stator 3 existing tool kit. Thus narrow chambers 21 develop between in each case a stator and the next rotor.

The remark example plans now an appropriate and favourable arrangement going by that the distances are adjustable S between rotor 2 and stator 3, so that accordingly also the width of these chambers 21 changes and can spacer conditions in relation to figure 1 be even turned around; the distances can if necessary be larger within a tool kit than between the individual tool kits after such an adjustment.

In the remark example this adjustableness is realized thereby that the stators 3 adjusting spindle 8 interspersing at the outer edge is intended, with which the stators 3 and them belonging to spacers 9 relative to the rotors 2 axially adjustable and definable is. One recognizes clearly that a twist of the spindle leads 8 in accordance with the curved double arrow Pf2 in figure 1 due to the being fixed storage this spindle 8 over their threads 10 and with it cooperating Gegengewinde at a stator or a spacer to the fact that the entire stator package with its spacers 9 is shifted according to the upward gradient of the thread 10 and the respective direction of rotation. Since the rotors are stored independently of the stators on the drive shaft 11, they do not take part in this movement, so that the distances between rotors 2 and stators 3 change perforce. Fig. 1 shows the greatest possible shifting way W, to which about the width of the chambers 21 corresponds. The rotors are individually in each case solvable on the driveshaft 11 and the stators 3 individually in each case solvable on their retaining elements, in the remark example retaining staffs 12 up-threaded or lined up. Both tool tools are held thereby by spacers 9 and 13 distance. This single assembly of the tools permits their individual replacement depending upon wear. Conceivable it is for example that for the entrance 6 tools 2 and 3 a larger wear than, next lying, removes lying tools are suspended.

The structure of the entire machine 1 is very simple. One recognizes with common view of the two figures the fact that the housing wall 7 containing housing coat 14 with a supply opening 15 containing cover 16 on the one hand and an outlet casing 17 with the outlet 18 on the other hand by close of the housing wall 7 running connecting bolts 19 struted and fixed is. In addition within the housing 14 those are intended the stators 3 9 oh savings alleles attaching pins recapitulatory with their spacers or - staffs 12. Also the adjusting spindle 8 is arranged between housing wall 7 and outside extent of the rotors 2. In figure 2 it becomes clear that the connecting bolts 19, which are attachment staffs 12 and the adjusting spindle 8 practically all transferred on the same extent circle K within the housing 14 to the extent against each other arranged in each case. Since they have different cross sections, nevertheless production and assembly are simple. The rotors 2 serving as rotary tools and the stators 3 of the Dispergiermaschine 1 serving as standing tools are trained as flat disks with break-throughs 4 and 5, arranged axially next to each other, so that radially in each case spreading toothed or slit tool tools and their complex and expensive production are unnecessary.

On the drive shaft 11 of the rotors 2 one recognizes a pump impeller 20, which supports or causes the promotion of the medium by the machine 1 still in promotion direction of the property before the first tool kit, thus in direct connection to the entrance 6 and/or the supply opening 15, so that an expensive upstream separate pump can be saved.

Machine translation DE3818453A

CLAIMS

1. Dispergiermaschine (1) with at least one rotor (2) as rotary tools and with at least this neighbouring stator (3) as standing tools, whereby rotor (2) and stator (3) have break-throughs (4, 5), which agree alternating with one another during the turn of the rotor (2) and is against each other transferred and which by them through-promoted medium and its components disperse, by the fact marked that in each case the rotor (2) and the stator (3) are a flat disk with break-throughs (4, 5).

2. Dispergiemaschine according to requirement 1, by the fact characterized that the break-throughs (4, 5) are in the disks over their surface and/or extent distributed slots.
3. Dispergiemaschine according to requirement 1 or 2, by the fact characterized that the schlitzfoemigen break-throughs (4, 5) are arranged to the disk diameter radially and/or diagonally or curved.
4. Dispergiemaschine after one of the requirements 1 to 3, by the fact characterized that at least individual Druchbrueche (4, 5) or slots of the rotor/the rotors (2) is or all break-throughs (4, 5) or slots at the disk extent edge open.
5. Dispergiemaschine after one of the requirements 1 to 4, by the fact characterized that the slots have preferably continuous width and at a tool disk alternating longer slots (4) and shorter slots (5) over the extent next to each other are distributed.
6. Dispergiemaschine after one of the requirements 1 to 5, by the fact characterized that the rotors (2) and the stators (3) have agreeing break-throughs (4, 5), which are arranged preferably in agreeing distances to the axle center (A) of the tools.
7. Dispergiemaschine after one of the requirements 1 to 8, by the fact characterized that several are arranged from rotor disk (2) and stator disk (of 3) existing tool kits axially next to each other in each case.
8. Dispergiemaschine after one of the requirements 1 to 7, by the fact characterized that the distance between rotor (2) and stator (3) is smaller within a tool kit than the distance to the next tool kit.
9. Dispergiemaschine, in particular after one of the requirements 1 to 8, by the fact characterized that the distances between rotor (2) and stator (3) are adjustable.
10. Dispergiemaschine after one of the requirements 1 to 9, by it characterized in particular that at least one is intended that or the stators (3) at the outer edge seizing or interspersing adjusting spindle (8) od. such, with which the stators (3) relative to the rotors (2) axially adjustable and definable it is.
11. Dispergiemaschine after one of the requirements 1 to 10, by the fact characterized that the rotors (2) individually in each case solvable on the driveshaft (11) and the stators (3) individually in each case solvable on retaining elements or - staffs (12) lined up, if necessary by spacers (9, 13) distance is to each other held.
12. Dispergiemaschine after one of the requirements 1 to 11, by the fact characterized that preferably on the drive shaft (11)/the rotors (2) in promotion direction (Pfl) of the property before the first tool kit a pump impeller (20) is located.
13. Dispergiemaschine after one of the requirements 1 to 12, by the fact characterized that the driveshaft (11) is horizontal arranged.
14. Dispergiemaschine after one of the requirements 1 to 13, by the fact characterized that those the stators (3) with their spacers (9) recapitulatory, in-special eight parallel attaching pins or - staffs (12) od. such within their housing (14) are intended.
15. Dispergiemaschine after one of the requirements 1 to 14, by the fact characterized that the adjusting spindle (8) is arranged for adjusting the distances of the relocatable stators (3) opposite the rotors (2) between the housing wall (7) and the outside extent of the rotors (2), firm on the wave (11).
16. Dispergiemaschine after one of the requirements 1 to 15, by the fact characterized that the housing coat (14) with a supply opening (15) at the entrance (6) containing cover (16) on the one hand and an outlet casing (17) is on the other hand by connecting bolts (19) strutted.

17. Dispergiermaschine after one of the requirements 1 to 16, by the fact characterized that the connecting bolts (19), the attachment staffs (12) and the adjusting spindle (8) against each other in each case are transferred on the same extent circle (C) within the housing (14) in circumferential direction arranged.

18. Dispergiermaschine after one of the managing requirements, by the fact characterized that the stators (3) within the housing (14) it fixes or axially adjustably and the rotors (2) with its wave (11) for the change of the distances between the stators (3) and the rotors (2) is axially adjustable.